

Research Subjects:

- Numerical analysis: finite volume methods.
- Partial differential equations: systems and scalar conservation laws.
- Applications: fluid mechanic and dynamic of population.
- Non local operator: fractional Laplacian (theory and numerical approximation).
- Kinetic theory and numerical methods.

Academic professional experiences:

Currently **PhD student in mathematics**, *University Marie and Louis Pasteur (UMLP), Besançon, France*,
Co-advised by: Carlotta DONADELLO, Ulrich RAZAFISON, Bastien POLIZZI.
Analysis and numerical simulation of gas transport in networks and multiphase fluid systems.

Currently **Teaching Assistant**, *UMLP, Besançon, France*, Teaching duty: 64 hours per year.

2024 March to July **Internship in applied mathematics**, *UMLP, Besançon, France*, Advised by: Ulrich RAZAFISON.
Numerical schemes adapted to non-linear fractional conservation laws.

Invitations:

2026 April **Norwegian University of Science and Technology**, *Norway: Trondheim*, (2 weeks).
Espen Robstad JAKOBSEN.

2025 December **Università degli studi "G. d'Annunzio" Chieti-Pescara**, *Italy: Pescara*, (2 weeks).
Massimiliano Daniele ROSINI.

Academic training and diplomas:

2023 to 2024 **Master degree in advanced mathematics and Magister**, *UMLP, Besançon, France*.
Options: Numerical Analysis and Scientific Computing, Partial Differential Equations. Rank 3/13.

July 2023 **Agrégation of mathematics**.
French highly competitive examination for being an high school teacher and university lecturer. Specialty: probability-statistics. Rank 147/335.

2022 to 2023 **Master for Agrégation in Mathematics**, *UMLP, Besançon, France*.
Training for the examination of Agrégation of Mathematics. Rank 4/22.

2021 to 2022 **First year of Master degree in Mathematics**, *UMLP, Besançon, France*, Rank 4/29.

2020 to 2021 **Degree in fundamental Mathematics**, *UMLP, Besançon, France*, Rank 7/74.

2018 to 2020 **Higher School Preparatory Classes**, *High school Carnot, Dijon, France*.
Fields of study: Mathematic and Physics MPSI/MP.

Computer skills:

Programming: Python, Scilab, Julia, C++.

Office: $\text{\LaTeX}$, Microsoft office.

Teaching experiences:

2024 to 2027 **Teaching Assistant.**

University of Sciences and Techniques, Besançon:

- L1, Mathematics: Functions et Sequences (3×39 hours).
- L1, Earth Science and Life: Mathematics Tools (10 hours).
- L3, Mathematics: Technic of Mathematics (13,5 hours).

École Nationale Supérieure de Mécaniques et des Microtechniques SupMicrotchech, Besançon:

- First year: Optimization (2×18 hours).
- First year: Partial Differential Equations (2×2 hours).

Foreign languages:

English: Fluent.

Spanish: Some basic knowledge.

Publications

Submitted articles

2026 **Mathematical Modelling of One-Way Pressure-Activated Valves for Gas.**

Carlotta DONADELLO, Ulrich RAZAFISON, Massimiliano D. ROSINI, ESAIM: M2AN.

Articles in preparation

Kinetic Schemes for Fractional Conservation Laws.

Nathaël ALIBAUD, Espen R. JAKOBSEN.

Numerical simulations for an hyperbolic model involving an age-structured vole population and long distance dispersal.

Bastien POLIZZI, Ulrich RAZAFISON.

Talks and conferences:

Selected Presentations:

2026 **Journées des jeunes EDPpiste**, *Bordeaux, France.*

November Mathematical Modelling of One-Way Pressure-Activated Valves for Gas.

2026 June **Journée École doctorale Carnot Pasteur.**

Mathematical Modelling of One-Way Pressure-Activated Valves for Gas (Prize for the best presentation).

2026 April **Team Seminar**, *Norwegian University of Science and Technology, Trondheim, Norway.*

Mathematical Modelling of One-Way Pressure-Activated Valves for Gas.

2026 January **Invitation to PhD seminar**, *University de Bretagne Occidentale, Brest, France.*

Mathematical modelling of voles dispersal.

2025 **Team Seminar**, *Università degli studi "G. d'Annunzio" Chieti-Pescara, Pescara, Italy.*

December Mathematical Modelling of voles dispersal.

Poster:

2026 October **Conference: "PDEs under pressure and applications in life science"**, *Toulouse, France.*

Mathematical Modelling of One-Way Pressure-Activated Valves for Gas.

Selected conferences (as auditor):

2025 **Workshop "Hyperbolic Problems- Numeric and Theory"**, *Amiens, France.*

2025 **Workshop "Hyperbolic Problems in Nürberg"**, *Nürberg, Germany.*

2024 **Workshop "IEA CONPANHYE: Control problems for applied nonlinear hyperbolic equations, kick off meeting"**, *UMLP, Besançon, France.*

Thematic schools:

2025 April **Spring school "Hyperbolic Conservation Laws and Applications"**, *UMLP, Besançon, France.*

Popularization:

- 2024 to 2027 **Management of MathsEnJeans group activity**, *Middle school Aigremont, Roulans, France.*
A research workshop supervised by a teacher and a researcher, including the organization of a research taster day at the university.
- 2026 **Night of Researcher**, *Besançon, France.*
An event for the general public at a museum FRAC to introduce them to the world of research.
- 2025 May **Festival des Expérimetarium**, *Besançon, France.*
Running a public outreach workshop based on the research of PhD students (from France, Canada and Réunion) at the Citadel in Besançon
- 2025 **Discovery of Dooble: journées des lycéens**, *UMLP, Besançon, France.*
Workshop on making a Dooble game and exploring finite geometry.
- 2024 **Seminary IREM (Institute for Research into Mathematics Education)**, *Besançon, France.*
November From voles to fractional Laplacian. Seminar for secondary school teachers.

Responsibilities:

- 2025 June **Co-organizer of the internship MathsCPourL**, *Besançon, France.*
The Maths C for L courses are introductory research courses designed for female students on a Bachelor's degree in mathematics. As well as giving students an insight into what research involves through group projects, they aim to showcase the diversity of pathways and careers in mathematics.
- 2024-2027 **Representative of LmB PhD students at the Carnot Pasteur Doctoral School.**